Introductory Lab Module in Ecology and Evolutionary Biology

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Course Website: https://canvas.rice.edu/courses/10537

Course Description:
This is a two credit, half-semester course that introduces students to the science of ecology and evolutionary biology through hands-on, inquiry-based laboratory and field exercises. The class meets twice a week: a lecture on Mondays introduces the week's topic; students then attend one of three afternoon lab sections that provide practical experience in the fundamentals of natural history, data collection and analysis, and communication of results.

Course Learning goals:
By the end of the course, you will be expected to know and be able to do the following things:

- **Generate a valid scientific hypothesis** and suggest several feasible ways to test it;
- **Perform basic statistical analyses**, including t-tests and Chi-squared tests;
- **Search for and locate peer-reviewed research articles** and extract meaningful information;
- **Create a scientific report** using appropriate format, terminology, grammar, citations, and figures;
- **Demonstrate competence in basic skills** in ecology and evolutionary biology:
    - Formulate a valid hypothesis and design simple experiments to test it;
    - Survey a population and determine whether its sex ratio deviates from 1:1;
    - Conduct a biological species inventory, quantify the diversity of the samples collected, and assess the results;
    - Distinguish between ecosystems, habitats, and microhabitats and provide examples of each;
    - Identify abiotic and biotic factors that determine a species' geographic range and explain how these contribute to an organisms' fundamental and realized niche;
    - Explain the role of taxonomy in systematics and its importance to the biological sciences;
    - Approximate the number of living species on the planet and their relative distribution across the tree of life;
    - Reconstruct and interpret a phylogenetic tree;
    - Use online databases to search for, interpret, and analyze DNA sequence data.

Location and Time:
Lectures are Mondays from 2-2:50 PM in **BRK 101**. Labs are on Tuesdays, Wednesdays, and Thursdays from 1–5 PM in **ABL 124**. Due to space constraints, ***students must attend the lab section for which they are officially enrolled***.

Course Schedule:

Week	Date	Topic
Week 1	Feb 26	Lecture: Intro to conducting research in ecology and evolution
	Feb 27, 28, Mar 1	Lab 1: Squirrel behavior (around campus)
Week 2	Mar 5	Lecture: Locating research articles
	Mar 6, 7, 8	Lab 2: Scientific writing workshop (in lab)
	Mar 12 – 15	*NO CLASS*
Week 3	Mar 19	Lecture: Population biology and basic statistics
	Mar 20, 21, 22	Lab 3: Isopod population biology (around campus)
Week 4	Mar 26	Lecture: Introduction to local ecosystems
	Mar 27, 28, 29	Lab 4: Local ecosystems (Field trip—return by 7 pm)
Week 5	Apr 2	Lecture: Measuring biological diversity
	Apr 3, 4, 5	Lab 5: Biodiversity of leaflitter organisms (in lab)
Week 6	Apr 9	Lecture: Taxonomy and systematics
	Apr 10, 11, 12	Lab 6: Reconstructing evolutionary history (in lab)
Week 7	Apr 16	Lecture: Molecular evolutionary genetics
	Apr 17, 18, 19	Lab 7: The Tree of Life and molecular sequence data (in lab)

Requirements:
Students are required to attend all labs. Students must attend the lab section for which they are registered (unless they are ill, in which case they must contact Dr. Solomon ***before*** their scheduled class). Course announcements will be posted on the course website and sent to each students' Rice email addresses, so students are responsible for regularly checking both the course website and their email accounts.

Field Trip:
One of the labs (see schedule) will take place off campus. Transportation will be provided and will leave from campus. Because of the travel time (about an hour each way) we return to campus by 7 pm. ***Students must be prepared to get dirty and wet***; recommended clothing includes long pants, boots or old tennis shoes, a hat, sunscreen, insect repellant, a raincoat or poncho. Students should bring water and a snack. More details will be provided in the pre-lab lecture on.

Lab reports:
For each lab, students will complete an exercise during the scheduled class time (note that these hours will be extended for the field trip during lab 3). ***Lab reports will be submitted electronically and are generally due by Monday at noon the week following each lab.*** Reports submitted after the deadline will be penalized 5 points per 24 hours late.

Quizzes:
A weekly quiz consisting of 5 multiple-choice questions covering the pre-lab lecture and assigned reading will be available through the course website after the pre-class meeting and must be completed by 1 pm the following day (Tuesday).

Honor Code:
Quizzes are open notes, closed-book and closed-internet. Students are expected to work in groups during in-class laboratory exercises, but all laboratory reports should be completed individually. Any sources used to complete a lab report, including materials provided as part of the class (i.e. lectures and readings posted on the course website), must be properly cited.

Grading:
Grades for this course are based on quizzes taken on the course website following each lecture and lab write-ups due at the start of lab the following week. Points are assigned as follows:

Assignment	Points / Assignment	Number	Subtotal
Lab report 1	20	1	20
Lab report 2	20	1	20
Lab report 3	50	1	50
Lab report 4	30	1	30
Lab report 5	50	1	50
Lab report 6	30	1	30
Lab report 7	30	1	30
Quizzes	10	7	70
Total			300

The minimum point thresholds for each course letter grade are given below:

Letter Grade:	D–	D	D+	C–	C	C+	B–	B	B+	A–	A	A+
Minimum Points Needed:	180	189	204	210	219	234	240	249	264	270	279	294

Note:
If you have a disability that will impact your coursework, please speak with Dr. Solomon during the first two weeks of class. All discussions remain confidential. Additionally, in order to qualify for accommodations in this course you must also contact Disability Support Services (http://dss.rice.edu/) located in the Allen Center, Room 111.